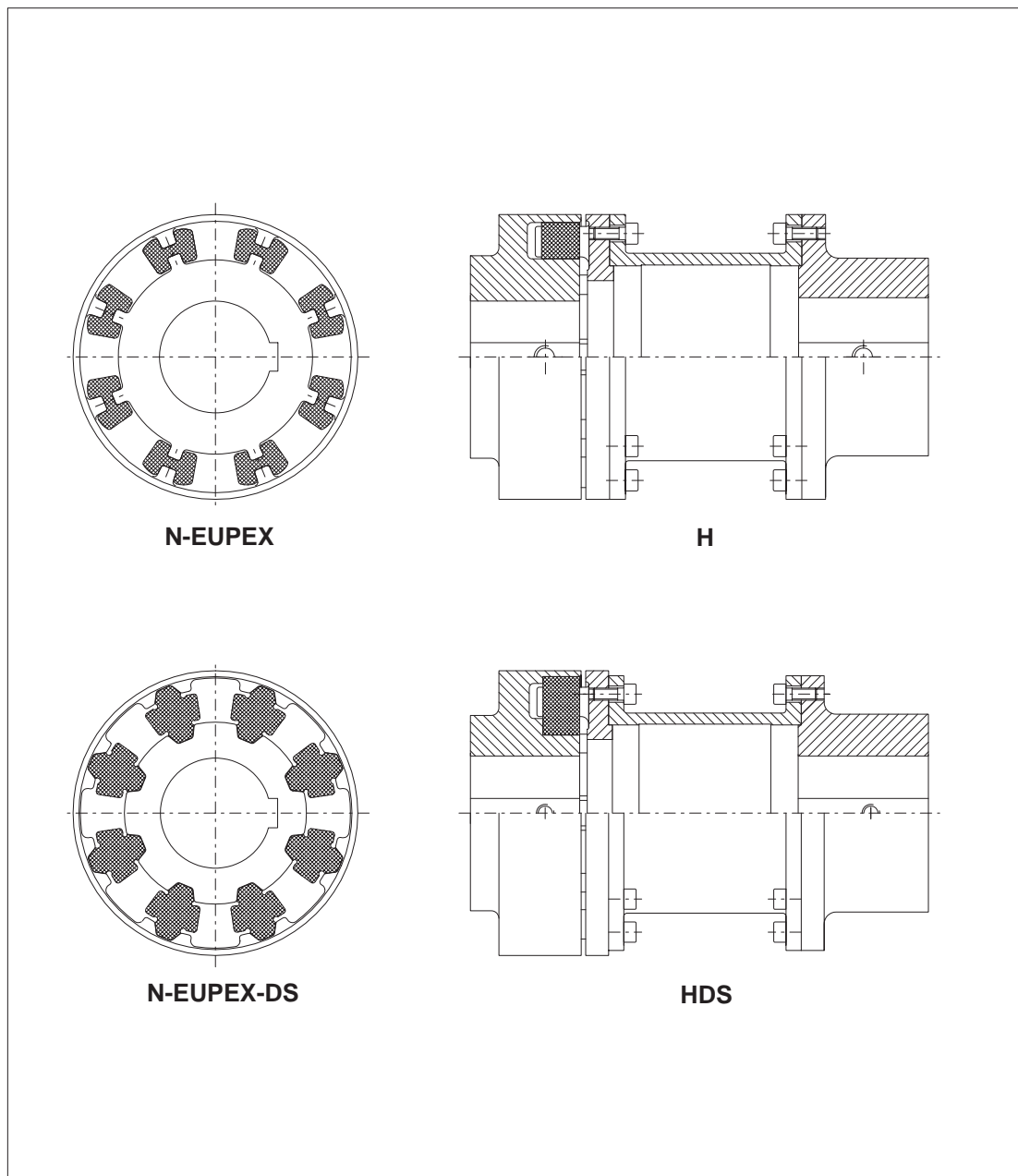


# Operating Instructions

## BA 3101 EN 07.03

Flexible **N-EUPEX** and **N-EUPEX-DS** couplings  
Types **H** and **HDS**



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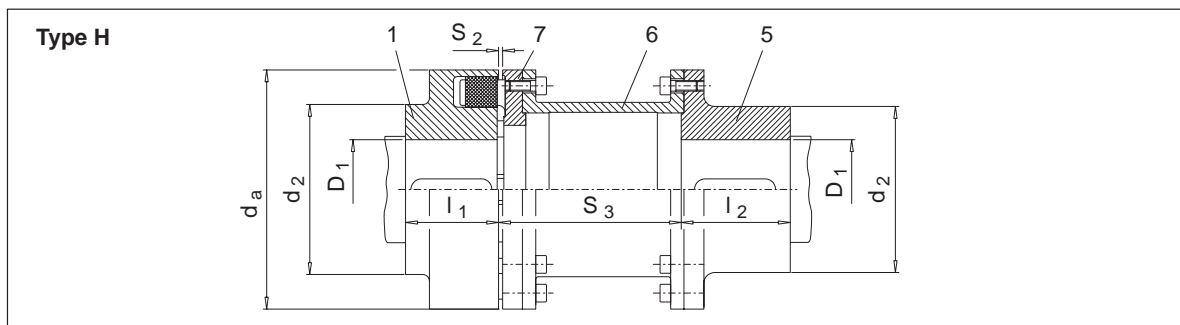
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## 1. Technical data

### 1.1 N-EUPEX Coupling Type H

#### 1.1.1 Geometric data



Size	Bore D <sub>1</sub>				d <sub>a</sub> mm	d <sub>2</sub>		l <sub>1</sub> mm	l <sub>2</sub> mm	S <sub>2</sub> +1 mm	S <sub>3</sub> +1 mm	Weight 1)		Mass moment of inertia 1)	
	Part 1 from mm	Part 1 to mm	Part 5 from mm	Part 5 to mm		Part 1 mm	Part 5 mm					Part 1 kg	Part 5+6+7 kg	Part 1 kgm <sup>2</sup>	Part 5+6+7 kgm <sup>2</sup>
80		30		32	80		55	30	45	5	100 140	0.8	2 2.1	0.0006	0.0014 0.0015
95		42		42	95	76	70	35	45	5	100 140	1.2	2.7 3	0.0013	0.0028 0.0031
110		48		48	110	86	80	40	50 50 60	5	100 140 180	1.9	3.9 4.3 4.7	0.0027	0.0056 0.006 0.0064
125		55		55	125	100	90	50	50 50 60 70 80	5	100 140 180 200 250	2.9	5.3 5.8 6.3 6.6 7.1	0.005	0.0099 0.01 0.011 0.0115 0.012
140		60		60	140	100	100	55	65 65 65 65 80	5	100 140 180 200 250	3.3	8 8.5 9 9.3 9.9	0.007	0.018 0.019 0.02 0.021 0.022
160		65		65	160	108	108	60	70 70 70 70 80	6	100 140 180 200 250	4.7	9.8 10.5 11.3 11.7 12.7	0.013	0.03 0.032 0.034 0.035 0.037
180		75		75	180	125	125	70	80	6	140 180 200 250	6.9	14.1 15 15.5 16.5	0.023	0.054 0.058 0.06 0.065
200		85		85	200	140	140	80	90	6	140 180 200 250	9.5	19.7 20.8 21.4 22.6	0.04	0.095 0.1 0.105 0.11
225		90		90	225	150	150	90	100	6	140 180 200 250 280	13	25.2 26 26.7 28.5 29.5	0.07	0.158 0.16 0.17 0.18 0.19
250	46	100	46	100	250	165	165	100	110	8	180 200 250	17.5	36 37.2 39	0.12	0.27 0.28 0.3
280	49	110	49	110	280	180	180	110	120	8	250	24	53.5	0.2	0.51
315	49 90	100 120	49 90	100 120	315	165 200	165 200	125	140	8	250	31 32	65.6 68.6	0.31 0.34	0.82 0.88
350	61 90	110 140	61 90	110 140	350	180 230	180 230	140	150	8	250	43 45	73 88	0.54 0.6	1.14 1.3
400	66 100	120 150	66 100	120 150	400	200 250	200 250	160	180	8	250	63 66	132 153	1 1.2	2.7 2.9
440	80 120	130 160	80 120	130 160	440	215 265	215 265	180	180	10	250	79 82	133 156	1.5 1.7	3.5 3.9

Table 1.1.1: Dimensions, weights and mass moments of inertia of Type H

1) Weights and mass moments of inertia apply to mean bores

## 1.1.2 Performance data

**Note:** For identification marking of the individual flexible elements, refer to section 5.

Flexible elements: 80 Shore A									
Size	Rated torque	Maximum torque	Fatigue torque	Speed	dynamic torsional stiffness $C_{T \text{ dyn}}$				
	$T_{KN}$	$T_{Kmax}$	$T_{KW}$	$n_{max}$	$1 \times T_{KN}$	$0.75 \times T_{KN}$	$0.5 \times T_{KN}$	$0.25 \times T_{KN}$	$0 \times T_{KN}$
	Nm	Nm	Nm	1/min	Nm/rad	Nm/rad	Nm/rad	Nm/rad	Nm/rad
<b>80</b>	60	180	24	5000	2750	1950	1400	980	700
<b>95</b>	100	300	40	5000	4200	3100	2300	1700	1280
<b>110</b>	160	480	64	5000	5700	4200	3100	2250	1670
<b>125</b>	240	720	96	5000	16000	10000	6200	3800	2400
<b>140</b>	360	1080	144	4900	24000	15000	9600	6200	4000
<b>160</b>	560	1680	224	4250	49000	34000	23000	16000	11000
<b>180</b>	880	2640	352	3800	78000	51000	33000	21500	14000
<b>200</b>	1340	4020	536	3400	127000	80000	51000	32000	20500
<b>225</b>	2000	6000	800	3000	210000	136000	87000	56000	36000
<b>250</b>	2800	8400	1120	2750	290000	176000	107000	65000	40000
<b>280</b>	3900	11700	1560	2450	365000	233000	149000	94000	60000
<b>315</b>	5500	16500	2200	2150	840000	540000	340000	215000	138000
<b>350</b>	7700	23100	3080	1950	920000	590000	380000	245000	160000
<b>400</b>	10300	30900	4120	1700	1350000	840000	530000	335000	210000
<b>440</b>	13500	40500	5400	1550	1830000	1180000	760000	490000	315000

damping coefficient  $\Psi = 1.1$

Flexible elements: 80 Shore A									
Size	Rated torque	Maximum torque	Fatigue torque	Speed	dynamic torsional stiffness $C_{T \text{ dyn}}$				
	$T_{KN}$	$T_{Kmax}$	$T_{KW}$	$n_{max}$	$1 \times T_{KN}$	$0.75 \times T_{KN}$	$0.5 \times T_{KN}$	$0.25 \times T_{KN}$	$0 \times T_{KN}$
	Nm	Nm	Nm	1/min	Nm/rad	Nm/rad	Nm/rad	Nm/rad	Nm/rad
<b>80</b>	37	113	15	5000	830	670	540	430	350
<b>95</b>	63	190	25	5000	1340	1110	920	760	640
<b>110</b>	100	300	40	5000	1800	1500	1200	1000	830
<b>125</b>	150	450	60	5000	4000	3000	2150	1600	1200
<b>140</b>	230	680	90	4900	6000	4600	3500	2600	2000
<b>160</b>	350	1060	140	4250	14000	11000	8800	7000	5500
<b>180</b>	550	1660	220	3800	20700	15700	12000	9200	7000
<b>200</b>	850	2530	337	3400	32200	24300	18000	13400	10200
<b>225</b>	1260	3780	504	3000	55000	41400	31500	24000	18000
<b>250</b>	1760	5300	705	2750	69000	50600	37000	27000	20000
<b>280</b>	2460	7400	980	2450	94000	71000	53000	39500	30000
<b>315</b>	3500	10500	1400	2150	216500	161500	121000	91000	69000
<b>350</b>	4850	14500	1940	1950	239000	181000	137000	104000	80000
<b>400</b>	6500	19500	2600	1700	336000	252000	189000	141000	105000
<b>440</b>	8500	25500	3400	1550	478000	362000	275000	208000	158000

damping coefficient  $\Psi = 1.1$

The performance data for the Type H are valid for:

- max. 25 starts per hour
- daily operating cycle of up to 24 h
- operation within the specified alignment
- Operation in the temperature range -30 °C to +80 °C in the immediate vicinity of the coupling

**Caution!**

**For sustained faultfree operation the coupling must be designed with a service factor  $f_1$  in accordance with item 1.3 and appropriate to the application. In the event of a change in operating conditions (e.g. output, speed, starting frequency, changes to the prime mover and driven machine) the design must always be checked (see item 1.1.3).**

### 1.1.3 Checking the selected coupling size

The following must apply to the coupling:

$$T_{KN} \geq T_N \times f_1$$

$T_{KN}$  = rated coupling torque

$T_N$  = rated system torque -  
rated drive torque acting on the coupling

$f_1$  = service factor in accordance with item 1.3

During starting or operation torque impulses up to 25 times per hour are permissible. The following applies:

$$T_{Kmax} \geq T_{max}$$

$T_{Kmax}$  = maximum coupling torque

$T_{max}$  = maximum system torque -  
peak drive torque acting on the coupling

The following must apply to the alternating torques occurring during operation:

$$T_{KW} \geq T_W \times S_f \times f_1$$

$T_{KW}$  = fatigue torque load on the coupling

$T_W$  = alternating torque load on the coupling

$f_1$  = service factor in accordance with item 1.3

$$S_f = \sqrt{\frac{f_{Err}}{10\text{Hz}}} \quad \text{for } f_{Err} > 10 \text{ Hz}$$

$$S_f = 1.0 \quad \text{for } f_{Err} \leq 10 \text{ Hz}$$

$f_{Err}$  = excitation frequency of the alternating torque load in Hz

**Caution!**

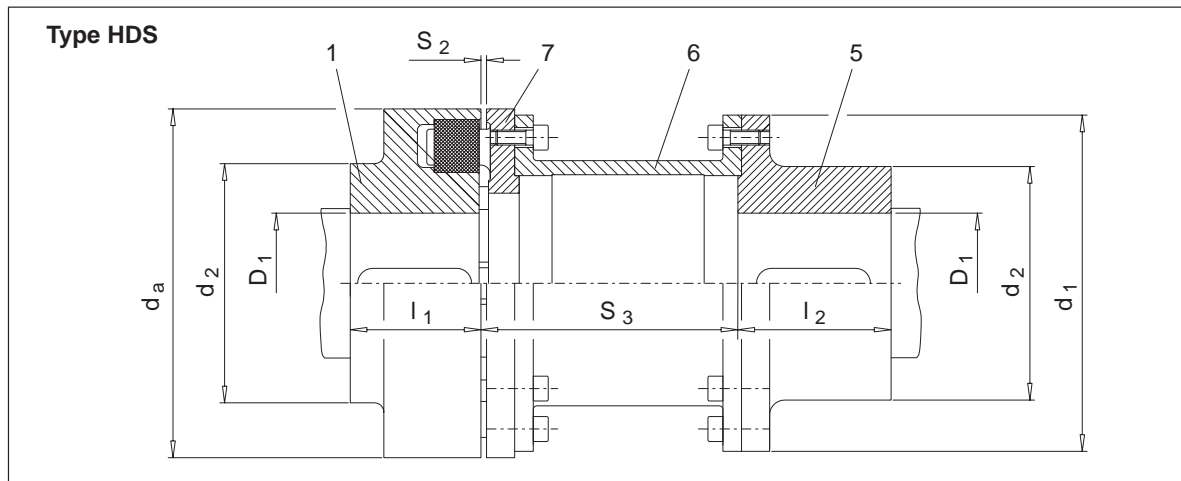
**When selecting the coupling, the permissible maximum speed and the permissible maximum bore must also be taken into consideration. Selection of bore fit in accordance with section 6. item 6.1.1.**

**Caution!**

**The shaft displacement values specified in section 6, item 6.5.4, must not be exceeded.**

## 1.2 N-EUPEX-DS Coupling Type HDS

### 1.2.1 Geometric data



Size	Bore D <sub>1</sub>				d <sub>a</sub> mm	d <sub>1</sub> mm	d <sub>2</sub>		l <sub>1</sub> mm	l <sub>2</sub> mm	S <sub>2</sub> +1 mm	S <sub>3</sub> +1 mm	Weight 1) Part		Mass moment of inertia 1) Part	
	Part 1		Part 5				1 mm	5 mm					1 kg	5+6+7 kg	1 kgm <sup>2</sup>	5+6+7 kgm <sup>2</sup>
	from mm	to mm	from mm	to mm												
88		30		32	88	80		55	30	45	5	100 140	1	2 2.1	0.0007	0.0014 0.0015
103		42		42	103	95	76	70	35	45	5	100 140	1.6	2.8 3.1	0.0015	0.003 0.0033
118		48		48	118	110	86	80	40	50 50 60	5	100 140 180	1.9	4 4.4 4.8	0.003	0.006 0.0064 0.0068
135		55		55	135	125	100	90	50	50 50 60 70 80	5	100 140 180 200 250	3.1	5.5 6 6.5 6.8 7.3	0.006	0.0107 0.0108 0.0118 0.0123 0.0128
152		60		60	152	140	108	100	55	65 65 65 65 80	5	100 140 180 200 250	4.2	8.3 8.8 9.3 9.6 10.2	0.011	0.0196 0.0206 0.0216 0.0226 0.0236
172		65		65	172	160	118	108	60	70 70 70 70 80	6	100 140 180 200 250	5.8	10.1 10.8 11.6 12 13	0.019	0.0323 0.0343 0.0363 0.0373 0.0393
194		75		75	194	180	135	125	70	80	6	140 180 200 250	8.8	14.5 15.4 15.9 16.9	0.037	0.058 0.062 0.064 0.069
218		85		85	218	200	150	140	80	90	6	140 180 200 250	12	20.5 21.6 22.2 23.4	0.062	0.103 0.108 0.113 0.118
245		90		90	245	225	150	150	90	100	6	140 180 200 250 280	14.5	25.6 27 27.7 29.5 30.5	0.09	0.16 0.17 0.18 0.19 0.2
272	46	100	46	100	272	250	165	165	100	110	8	180 200 250	20	37.5 38.5 40.5	0.16	0.3 0.31 0.33

Table 1.2.1: Dimensions, weights and mass moments of inertia of Type HDS

1) Weights and mass moments of inertia apply to mean bores

## 1.2.2 Performance data

Size	Rated torque $T_{KN}$ Nm	Maximum torque $T_{Kmax}$ Nm	Fatigue torque $T_{KW}$ Nm	Speed $n_{max}$ 1/min	dynamic torsional stiffness $C_{T\ dyn\ 1)}$ Nm/rad
<b>88</b>	60	180	24	5000	5600
<b>103</b>	100	300	40	5000	9350
<b>118</b>	160	480	64	5000	15000
<b>135</b>	240	720	96	5000	22450
<b>152</b>	360	1080	144	4900	33650
<b>172</b>	560	1680	224	4250	52350
<b>194</b>	880	2640	352	3800	82250
<b>218</b>	1340	4020	536	3400	125250
<b>245</b>	2000	6000	800	3000	187000
<b>272</b>	2800	8400	1120	2750	114000

damping coefficient  $\Psi = 1.1$

1) The dynamic torsional stiffness applies at an ambient temperature of -30 °C to +40 °C

The performance data for the Type HDS are valid for:

- max. 25 starts per hour
- daily operating cycle of up to 24 h
- operation within the specified alignment
- Operation in the temperature range -30 °C to +80 °C in the immediate vicinity of the coupling

### **Caution!**

For sustained faultfree operation the coupling must be designed with a service factor  $f_1$  in accordance with item 1.3 and a temperature factor  $S_\theta$  appropriate to the application. In the event of a change in operating conditions (e.g. output, speed, starting frequency, changes to the prime mover and driven machine) the design must always be checked (see item 1.2.3).



## 1.2.3 Checking the selected coupling size

The following must apply to the coupling:

$$T_{KN} \geq T_N \times f_1 \times S_{\vartheta}$$

$T_{KN}$  = rated coupling torque  
 $T_N$  = rated system torque -  
           rated drive torque acting on the coupling  
 $f_1$  = service factor in accordance with item 1.3  
 $S_{\vartheta}$  = temperature factor

The highest temperature in the immediate vicinity of the coupling must be applied

$T_U$	from -30 °C to +40 °C	from +40 °C to +60 °C	from +60 °C to +80 °C
$S_{\vartheta}$	1	1.4	1.8

Table 1.2.3: Temperature factor  $S_{\vartheta}$

During starting or operation torque impulses up to 25 times per hour are permissible. The following applies:

$$T_{Kmax} \geq T_{max} \times S_{\vartheta}$$

$T_{Kmax}$  = maximum coupling torque  
 $T_{max}$  = maximum system torque -  
           peak drive torque acting on the coupling  
 $S_{\vartheta}$  = temperature factor

The following must apply to the alternating torques occurring during operation:

$$T_{KW} \geq T_W \times S_f \times S_{\vartheta} \times f_1$$

$T_{KW}$  = fatigue torque load on the coupling  
 $T_W$  = alternating torque load on the coupling  
 $S_{\vartheta}$  = temperature factor  
 $f_1$  = service factor in accordance with item 1.3

$$S_f = \sqrt{\frac{f_{Err}}{10\text{Hz}}} \quad \text{for } f_{Err} > 10 \text{ Hz}$$

$$S_f = 1.0 \quad \text{for } f_{Err} \leq 10 \text{ Hz}$$

$f_{Err}$  = excitation frequency of the alternating torque load in Hz

### Caution!

When selecting the coupling, the permissible maximum speed and the permissible maximum bore must also be taken into consideration. Selection of bore fit in accordance with section 6. item 6.1.1.

### Caution!

The shaft displacement values specified in section 6, item 6.5.4, must not be exceeded.

## 1.3 Determining the service factor

The service factors taken as basis are based on empirical values which generally estimate the output of in- and output combinations in service.

Service factor $f_1$ (daily operating cycle of up to 24 h)			
Prime mover	Load characteristic of driven machine		
	G	M	S
Electric motors, Turbines, Hydraulic motors	1	1.25	1.75
Piston engines 4-6 cylinders Coefficient of cyclic variation up to 1 : 100 to 1 : 200	1.25	1.5	2
Piston engines 1-3 cylinders Coefficient of cyclic variation up to 1 : 100	1.5	2	2.5

Load characteristics of driven machines listed by area of application		
<b>Dredgers</b> S Bucket-chain conveyors S Travelling gear (caterpillar) M Travelling gear (rails) M Manoeuvring winches M Lift pumps S Bucket wheels S Cutter heads M Slewing gear <b>Building machinery</b> M Hoists M Concrete mixers M Road construction machinery <b>Chemical industry</b> M Cooling drums M Mixers G Agitators (light liquids) M Agitators (semi-liquid material) M Drying drums G Centrifuges (light) M Centrifuges (heavy) <b>Mineral oil extraction</b> M Pipeline pumps S Rotary drilling equipment <b>Conveyor systems</b> M Hauling winches S Hoists M Link conveyors M Belt conveyors (bulk material) S Belt conveyors (piece goods) M Band pocket conveyors M Endless chain transporters M Rotary conveyors M Goods lifts G Bucket-type flour conveyors M Passenger lifts M Apron conveyors M Screw conveyors M Ballast elevators S Inclined hoists M Steel belt conveyors M Trough chain conveyors <b>Blowers, Ventilators</b> G Rotary piston blowers $T_N \leq 75 \text{ Nm}$ M Rotary piston blowers $T_N \leq 750 \text{ Nm}$ S Rotary piston blowers $T_N > 750 \text{ Nm}$ G Blowers (axial/radial) $T_N \leq 75 \text{ Nm}$ M Blowers (axial/radial) $T_N \leq 750 \text{ Nm}$ S Blowers (axial/radial) $T_N > 750 \text{ Nm}$ G Cooling tower fans $T_N \leq 75 \text{ Nm}$ M Cooling tower fans $T_N \leq 750 \text{ Nm}$ S Cooling tower fans $T_N > 750 \text{ Nm}$ G Induced draught fans $T_N \leq 75 \text{ Nm}$ M Induced draught fans $T_N \leq 750 \text{ Nm}$ S Induced draught fans $T_N > 750 \text{ Nm}$ G Turbo blowers $T_N \leq 75 \text{ Nm}$ M Turbo blowers $T_N \leq 750 \text{ Nm}$ S Turbo blowers $T_N > 750 \text{ Nm}$	<b>Generators, transformers</b> S Frequency transformers S Generators S Welding generators <b>Rubber processing machines</b> S Extruders M Calenders S Pug mills M Mixers S Rolling mills <b>Wood working machines</b> S Barkers M Planing machines G Wood working machines S Saw frames <b>Cranes</b> G Luffing gear S Travelling gear S Hoisting gear M Slewing gear M Derricking jib gear <b>Plastics processing machines</b> M Extruders M Calenders M Mixers M Crushers <b>Metal working machines</b> M Sheet bending machines S Sheet straightening machines S Hammers S Planing machines S Presses M Shears S Forging presses S Punch presses G Countershafts, shaft trains M Machine tools, main drives G Machine tools, auxiliary drives <b>Food processing machines</b> G Bottling and container filling machines M Kneading machines M Mash tubs, crystallizers G Packaging machines M Cane crushers M Cane knives S Cane mills M Sugar beet cutters M Sugar beet washing machines <b>Paper processing machines</b> S Couches S Glazing cylinders S Pulpers S Pulp grinders S Calenders S Wet presses S Willows S Suction presses	S Suction rolls S Drying cylinders <b>Pumps</b> S Piston pumps G Centrifugal pumps (light liquids) M Centrifugal pumps (heavy liquids) S Plunger pumps S Pressure pumps <b>Stone and clay working machines</b> S Crushers S Rotary kilns S Hammer mills S Ball mills S Tube mills S Beater mills S Brick presses <b>Textile machines</b> M Batches M Printing and dyeing machines M Tanning vats M Willows M Looms <b>Compressors</b> S Piston compressors M Turbo compressors <b>Rolling mills</b> S Sheet shears M Sheet tilters S Ingot pushers S Blooming and slabbing mills S Ingot conveying systems M Wire drawing benches S Descaling machines S Thin sheet mills S Heavy sheet mills M Winding machines (strip and wire) S Cold rolling mills M Chain transfers S Billet shears M Cooling beds M Cross transfers M Roller tables (light) S Roller tables (heavy) M Roller straighteners S Tube welding machines M Trimming shears S Cropping shears S Continuous casting plant M Roller adjustment drives S Shifting devices <b>Laundry machines</b> M Tumble driers M Washing machines <b>Water treatment</b> M Rotary aerators G Screw pumps

G = uniform load

M = medium load

S = heavy load

## 2. General notes

### 2.1 Introduction

These Operating Instructions (BA) are an integral part of the coupling delivery and must be kept in its vicinity for reference at all times.

<b>Caution!</b>
-----------------

**All persons involved in the installation, operation, maintenance and repair of the coupling must have read and understood these Operating Instructions and must comply with them at all times. We accept no responsibility for damage or disruption caused by disregard of these Instructions.**

The "**Coupling**" described in these operating instructions has been developed for stationary use in general engineering applications. The coupling serves to transmit power and torque between two shafts or flanges connected by this coupling.

The coupling is designed only for the application described in section 1. "Technical data". Other operating conditions must be contractually agreed.

The coupling described in these Instructions reflects the state of technical development at the time these Instructions went to print.

In the interest of technical progress we reserve the right to make changes to the individual assemblies and accessories which we regard as necessary to preserve their essential characteristics and improve their efficiency and safety.

### 2.2 Copyright

The copyright to these Operating Instructions is held by **FLENDER AG**.

These Operating Instructions must not be wholly or partly reproduced for competitive purposes, used in any unauthorised way or made available to third parties without our agreement.

Technical enquiries should be addressed to the following works

FLENDER AG  
D 46393 Bocholt

Telefon: 02871/92-2868  
Telefax: 02871/92-2579

or to one of our customer-service addresses. A list of our customer-service addresses is given in section 11. "Spare parts, customer-service addresses".

## 3. Safety notes

### 3.1 Proper use

- The coupling has been manufactured in accordance with the state of the art and is delivered in a condition for safe and reliable use. Any changes on the part of the user which may affect safety and reliability are prohibited. This applies equally to safety features designed to prevent accidental contact.
- The coupling must be used and operated strictly in accordance with the conditions laid down in the contract governing performance and supply.

### 3.2 Obligations of the user

- The operator must ensure that all persons involved in installation, operation, maintenance and repair have read and understood these Operating Instructions and comply with them at all times in order to:

- avoid injury or damage,
- ensure the safety and reliability of the coupling,

and

- avoid disruptions and environmental damage through incorrect use.
- During transport, assembly, installation, dismantling, operation and maintenance of the unit, the relevant safety and environmental regulations must be complied with at all times.
- The coupling must be operated, maintained or repaired only by authorised, duly trained and qualified personnel.
- All work must be carried out with great care and with due regard to safety.
- All work on the coupling must be carried out only when it is at a standstill.  
The drive unit must be secured against being switched on accidentally (e.g. by locking the key switch or removing the fuses from the power supply). A notice should be attached to the ON switch stating clearly that work is in progress.
- The coupling must be fitted with suitable safeguards to prevent accidental contact. The operation of the coupling must not be impaired by the safeguard.
- The drive unit must be shut down as soon as changes to the coupling are detected during operation.
- If the coupling is intended for installation in plant or equipment, the manufacturer of such plant or equipment must ensure that the contents of the present Operating Instructions are incorporated in his own instructions.
- All spare parts must be obtained from FLENDER.

### 3.3 Warnings and symbols used in these Instructions



This symbol indicates safety measures which must be observed to avoid **personal injury**.

**Caution!**

This symbol indicates safety measures which must be observed to avoid **damaging the coupling**.

**Note:**

This symbol indicates general **operating instructions** which are of particular importance.

## 4. Handling and storage

### 4.1 Scope of supply

The products supplied are listed in the despatch papers. Check immediately on receipt to ensure that all the products listed have actually been delivered. Parts damaged during transport or missing parts must be reported in writing immediately.

The parts must be provided with explosion protection marking in accordance with section 5.

### 4.2 Handling

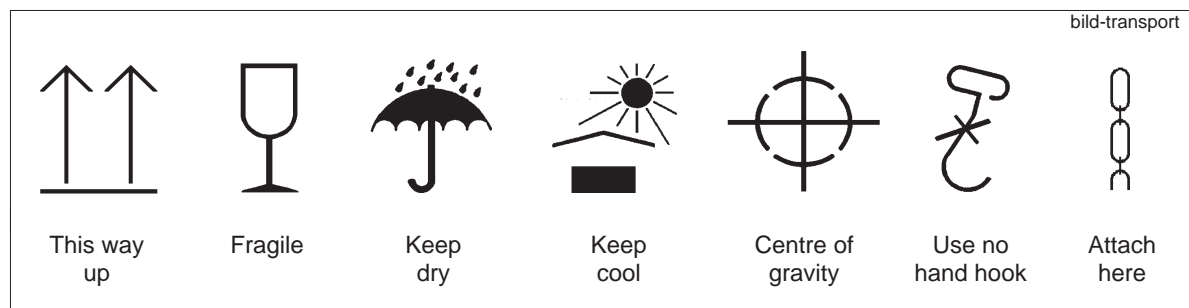


**When handling FLENDER products, use only lifting and handling equipment of sufficient load-bearing capacity!**

**Note:** The coupling must be transported using suitable transport equipment only.

Different forms of packaging may be used depending on the size of the coupling and method of transport. Unless otherwise agreed, the packaging complies with the **HPE Packaging Guidelines**.

The symbols marked on the packaging must be observed at all times. These have the following meanings:



### 4.3 Storage of the coupling

#### 4.3.1 Storage of the coupling parts

Unless otherwise expressly agreed, the coupling is delivered in a preserved condition and can be stored in a covered, dry place for up to 3 months. If the coupling is to be stored for a protracted period, it should be treated with a long-term preservative agent (FLENDER must be consulted).

#### **Caution!**

**Before cleaning the coupling parts and applying the long-term preservative agent, the flexible elements (12) must be removed.**

#### 4.3.2 Storing the flexible elements

##### 4.3.2.1 General

Correctly stored flexible elements (12) retain their properties unchanged for up to five years. Unfavourable storage conditions and improper treatment will negatively affect the physical properties of the flexible elements (12). Such negative effects may be caused by e.g. the action of ozone, extreme temperatures, light, moisture, or solvents.

##### 4.3.2.2 Storage area

The storage area must be dry and free from dust. The flexible elements (12) must not be stored with chemicals, solvents, motor fuels, acids, etc. Furthermore, they should be protected against light, in particular direct sunlight and bright artificial light with a high ultraviolet content.

#### **Caution!**

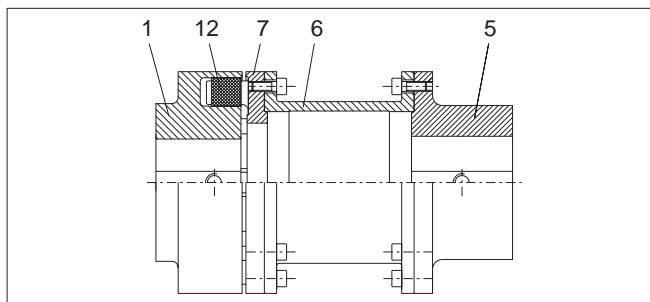
**The storage areas must not contain any ozone-generating equipment, e.g. fluorescent light sources, mercury vapour lamps, high-voltage electrical equipment. Damp storage areas are unsuitable. Ensure that no condensation occurs. The most favourable atmospheric humidity is below 65 %.**

## 5. Technical description

### 5.1 General description

N-EUPEX couplings are torsionally flexible claw couplings. They are suitable for linking machines and can compensate for small shaft misalignment caused by manufacturing inaccuracies, heat expansion, and the like.

The N-EUPEX coupling Type H / HDS comprises the coupling part 1 with the inserted flexible elements (12), the cam part 7 and the coupling part 5 and intermediate part (6) which connects part 5 and part 7. This intermediate part enables, for instance in centrifugal pump drives, the dismantling of the bearing support with impeller, without need of removing the motor.



Because of the form-fitting design of the metal parts, type H enables an "emergency operation" even after the flexible elements (12) have been irreparably damaged.

The flexible elements (12) are subjected primarily to pressure loads, so that the wear on the flexible elements (12) is relatively low with infrequent, substantial overload moments.



**Where overload moments are excessively high, the result may be breakage of the coupling or irreparable damage to the connected machine.**

On Type HDS there is no metal contact when the flexible elements (12) are irreparably damaged, and the metal parts are not of a form-fitting design. This coupling type has no "emergency operation" capability in the above described sense. The flexible elements (12) are subjected to shear and pressure loads, so that with substantial overload the flexible elements (12) are irreparably damaged and the torque transmission interrupted.

### 5.2 Flexible elements

As well as in standard hardness 80 Shore A, the H-shaped flexible elements (12) of Type H of Perbunan are also available in the softer 60 Shore A version.

This enables to move critical speeds of the drive train out of normal operating conditions.

When using these flexible elements (12), the reduction of the transmissible torque must be noted (see section 1. "Technical Data").

For reversing operation and drives with very high masses to accelerate and strong shock loads N-EUPEX couplings, Type H, may be fitted with higher flexible elements packs (12) with reduced torsional backlash.

The flexible elements (12) of Type HDS are available in 90 Shore A and 95 Shore A hardnesses.

The different flexible elements (12) are distinguished as follows:

Type	Size	Material	Hardness	Configuration	Identification marking
H	all sizes	Perbunan	80 Shore A	normal	blue stripe
	225 ... 440	Perbunan	60 Shore A	normal	green strip
	80 ... 200	Perbunan	80 Shore A	oversized	yellow stripe
	80 ... 200	Perbunan	60 Shore A	oversized	white stripe
HDS	all sizes	Polyurethan	90 Shore A	normal	blue flexible elements
	all sizes	Polyurethan	95 Shore A	normal	white flexible elements
	88 ... 272	Perbunan 2K	80/92 Shore A	normal	black flexible elements

**Caution!**

**Only identical flexible elements (12) may be used in one coupling.**

## 6. Assembly

At the customer's request FLENDER also delivers unbored or prebored coupling parts.

The necessary refinishing must be carried out in strict compliance with the following specifications and with particular care!

### Caution!

**Responsibility for carrying out the refinishing is borne by the orderer. FLENDER can accept no guarantee claims arising from unsatisfactory refinishing!**


6.1 Instructions for machining the finished bore, parallel keyway, axial retaining means, set screws and balancing

6.1.1 Finish bore

- Remove flexible elements
- Depreserve and, if necessary, clean coupling parts



**Note manufacturer's instructions for handling solvent.**

When machining the finished bore the parts must be carefully aligned. For the permissible radial and axial runout errors and the permissible cylindricity tolerances, refer to DIN ISO 286. The parts must be mounted on the marked faces (  ).

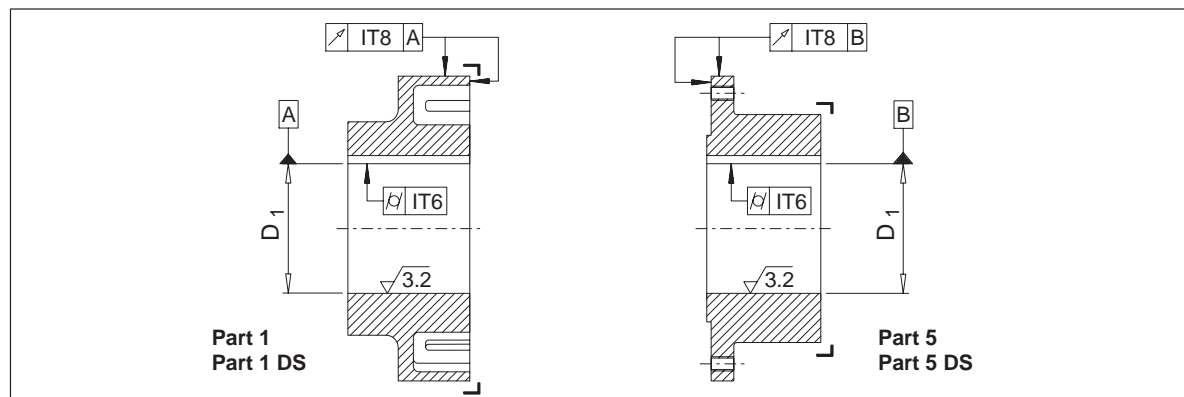
### Caution!

**The maximum permissible bore diameters (see section 1.) are designed for drive-type fastenings without taper action to DIN 6885/1 and must not under any circumstances be exceeded. The finish-machined bores must be 100% checked with suitable measuring equipment.**

If other shaft - hub connections (e.g. taper or stepped bore, etc.) are to be used instead of the flanged sleeve connections provided for, FLENDER must be consulted.

Flanged sleeve connections with taper action are not permissible.

After intering the finished bore into part 5 the contact surface is to be plain machined in the same tension up to the centering. Doing so, max. 0.1 mm of the material must be removed from the facing surface.



For drive by means of parallel keys the following fit pairs are prescribed for the bores:

Selection of fit	Bore D <sub>1</sub>		Shaft tolerances	Bore tolerances
	over mm	to mm		
Shaft tolerances to FLENDER standard		25	k6	H7
	25	100	m6	
	100		n6	
Shaft tolerances to DIN 748/1		50	k6	H7
	50		m6	
System standard shaft		50	h6	K7
	50			M7
		all	h8	N7

Table 6.1.1: Fit pairs

## Caution!

The assigned fits must be adhered to in order, on the one hand, to keep the play in the shaft-hub connection as low as possible, depending on utilisation of the tolerance zones, or, on the other, to keep the hub tension arising from the oversize within the permissible load limit. Failure to adhere to the fits may impair the shaft-hub connection.  
If the tolerance values of the shafts deviate from those in table 6.1.1 above, FLENDER must be consulted.



Failure to observe these instructions may result in breakage of the coupling.  
Danger from flying fragments!

## 6.1.2 Parallel keyway

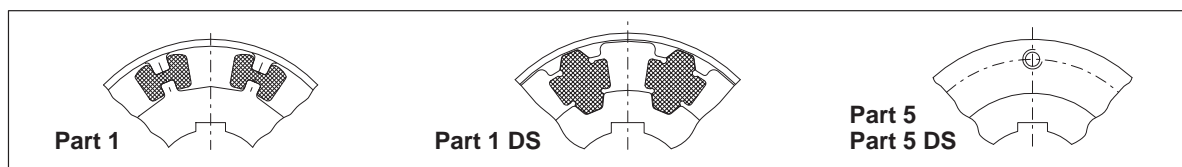
The parallel keyways must be designed in accordance with DIN 6885/1. If the keyway geometry deviates, FLENDER must be consulted. Taper keys or nose keys (gib headed keys) are not permissible.

The parallel keyways must be designed to suit the available parallel keys. For parallel keyways the tolerance zone of the hub keyway width **ISO JS 9** must be adhered to.

For **more difficult operating conditions** of the kind arising e.g. with reversing operation or operation with impulses the hub keyway tolerance zone **ISO P9** is specified.

## Caution!

In the case of part 1 the parallel key must be brought in centrally between the element lands or pockets, in the case of part 5 underneath the threaded bore.





## 6.1.3 Axial securing device

A set screw or end plate must be provided to secure the coupling parts axially. If end plates are used, FLENDER must be consulted with regard to machining the recesses in the coupling parts.

If the coupling part mounted on the shaft does not lie up against the shaft shoulder, we recommend using grooved spacer rings.

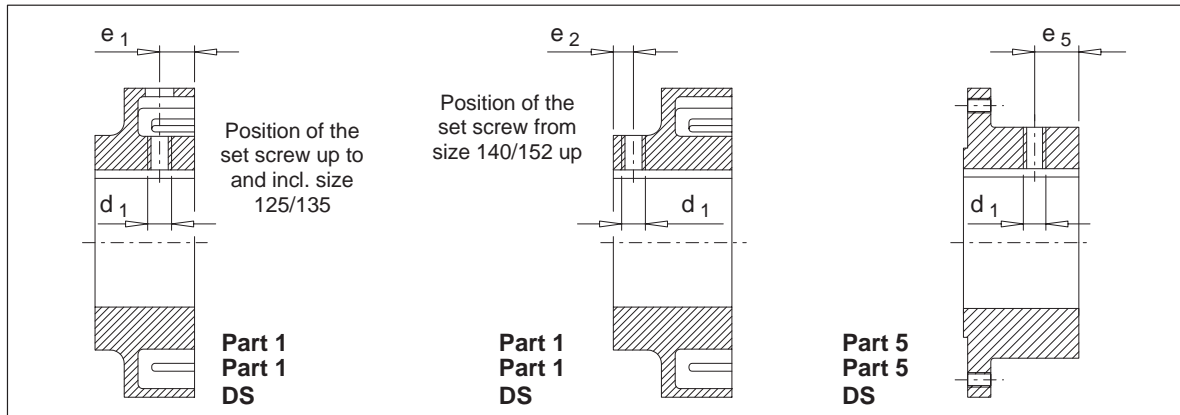
## 6.1.4 Set screws

Hexagon socket set screws with cup points to DIN 916 must be used for set screws.

The following guidelines must be observed!



**The length of the set screw must be selected so that it fills the tapped hole, but does not project from the hub ( $L_{\min} = d_1 \times 1.2$ ).**



Size	80	95	110	125	140	160	180	200	225	250	280	315	350	400	440
	88	103	118	135	152	172	194	218	245	272					
$d_1$	M6	M6	M6	M8	M8	M10	M12	M12	M12	M16	M16	M16	M20	M20	M24
$e_1$	*11	*15	18	20	—	—	—	—	—	—	—	—	—	—	—
$e_2$	—	—	—	—	13	13	16	20	22	24	28	35	40	50	60
$e_5$	15	20	25	25	30	35	40	45	50	55	60	65	70	80	90
1)	4	4	4	8	8	15	25	25	25	70	70	70	130	130	230

Table 6.1.3: Set screw assignment and tightening torques of the set screws

1) Tightening torques of the set screws in Nm

\*) Note following position of the set screw!

### Caution!

**The set screws must always be positioned on the keyway. An exception are the following coupling parts:**

**Part 1:** Size 80 / 88 :  
Size 95 / 103 :

Bore  $D_1 \geq 25$  mm set screw displaced by  $180^\circ$  relative to the keyway.  
Bore  $D_1 \geq 38$  mm set screw displaced by  $180^\circ$  relative to the keyway.

## 6.1.5 Balancing

Prebored couplings or prebored coupling parts are delivered unbalanced. It is recommended that these parts are balanced to suit the application after finish-boring (see DIN ISO 1940 and DIN 740/2), but to min. balancing quality G16.

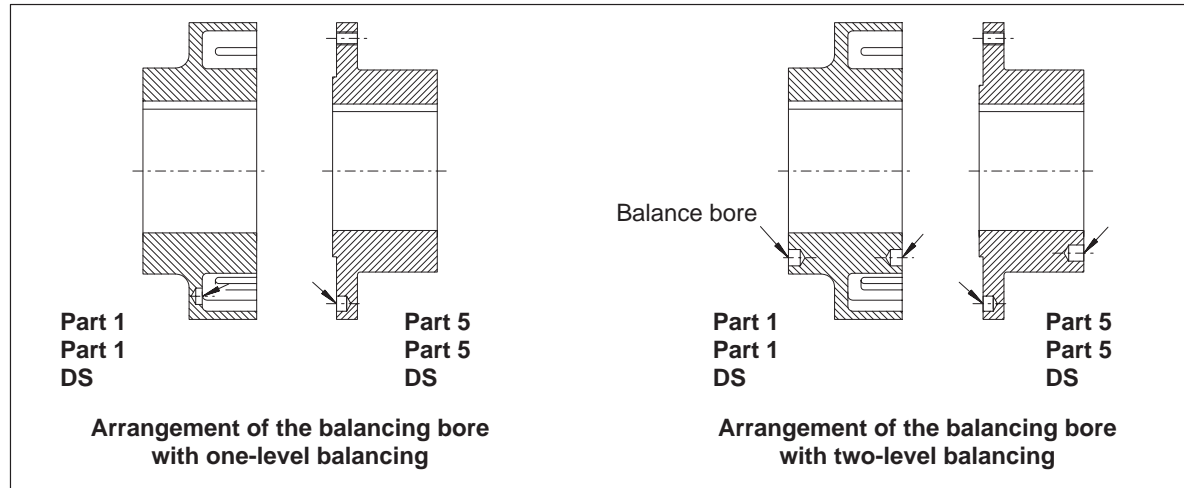
Balancing is normally done by drilling material away.

### Caution!

**On part 1 the material must be removed between the lands or pockets of the flexible elements without drilling right through the base and without damaging the pockets of the flexible elements.**

Part 6 is always balanced in two levels and part 7 is balanced in one level.

Finish-bored couplings or coupling parts are balanced according to the customer's specifications.



## 6.2 General information on installation

During assembly, Section 3. "Safety Instructions" must be observed.

Assembly and installation work must be done with great care by trained and qualified personnel.

As early as during the planning phase it must be ensured that sufficient space is available for installation and subsequent care and maintenance work.

Adequate lifting equipment must be available before beginning the installation and assembly work.

## 6.3 Mounting the coupling parts

Before beginning installation, the shaft ends and the coupling parts must be carefully cleaned. Before cleaning the coupling parts with solvent the flexible elements (12) must be removed.



**Note manufacturer's instructions for handling solvent.**

If necessary, heating the coupling parts (to max. +150 °C) will facilitate fitting. With temperatures over +80 °C the flexible elements (12) must be removed from the coupling parts before heating.



**Take precautions to avoid burns from hot components!**

**Caution!**

**The coupling parts must be fitted with the aid of suitable equipment to avoid damaging the shaft bearings through axial joining forces. Always use suitable lifting equipment.**

Axial securing is effected by means of the set screw or end plate.

**Caution!**

**Tightening the set screws to a tightening torque in accordance with item 6.1.4.**



**Failure to observe these instructions may result in breakage of the coupling. Danger from flying fragments!**

After fitting the coupling parts, the flexible elements (12), if previously removed, must be fitted. Previously heated coupling parts must have cooled down again to a temperature below +80 °C. It must be ensured that the flexible elements (12) are of identical size and have identical markings.

The "Zero-side" of part 6 is marked on the flange by a circular groove (0.2 mm deep). This side **must** be bolted to part 5. As a result of unfavourably adding the individual plain and concentricity deviations of parts 5, 6 and 7 important concentricity deviations may occur, which can be reduced by changing the bolting position of parts 5 and 6.

Move together the machines to be coupled.



**Danger of squeezing!**

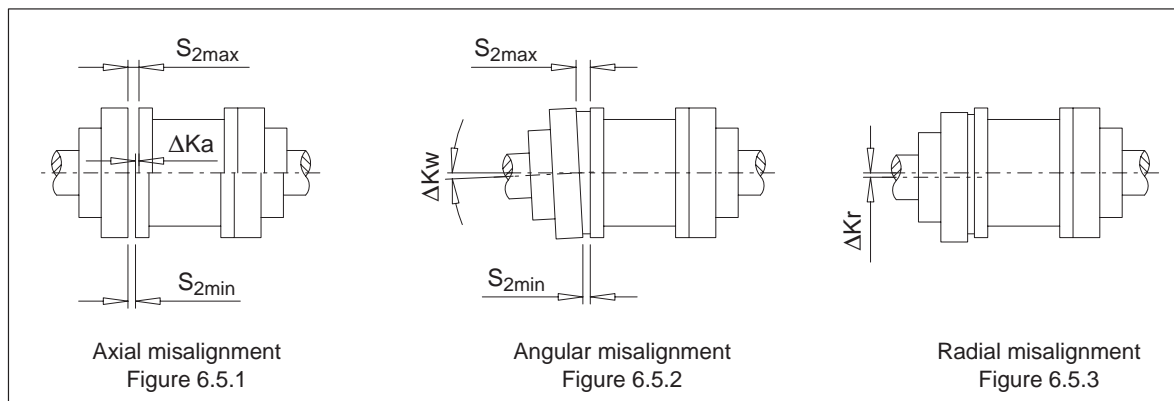
Dimension  $S_2$  must be adhered to. After aligning the tightening torques of the bolted connections of parts 5/6 and 6/7 must be checked (for tightening torques and gap dimension  $S_2$ , see item 6.6 and section 1.).

## 6.4 Alignment

The couplings pick up positional errors in the shaft ends to be connected up to the data shown in item 6.5.

When aligning, the radial and angular misalignment of the shaft ends must be kept as small as possible, because, other conditions being equal, this increases the service life of the flexible elements.

## 6.5 Possible misalignments



Misalignments of the coupling parts in relation to each other can be caused by inaccurate alignment during assembly, but also by actual operation of the equipment (expansion due to heat, shaft deflection, insufficiently rigid machine frames, etc.).

### Caution!

The following maximum permissible misalignments must by no means be exceeded during operation.

#### 6.5.1 Axial misalignment

Axial misalignment  $\Delta K_a$  (Fig. 6.5.1) of the coupling parts relative to one another is possible within the "permissible error" for dimension  $S_2$  (see section 1.).

#### 6.5.2 Angular misalignment

The angular misalignment  $\Delta K_w$  (Fig. 6.5.2) can usefully be measured as the difference in the gap dimension ( $\Delta S_2 = S_{2max} - S_{2min}$ ). For the permissible values for the difference in the gap dimension, refer to item 6.5.4.

If required, the permissible angular misalignment  $\Delta K_w$  can be calculated as follows:

$$\Delta K_{w \text{ perm}} \text{ in Rad} = \frac{\Delta S_{2 \text{ perm}}}{d_a}$$

$$\Delta K_{w \text{ perm}} \text{ in Degrees} = \frac{180}{\pi} \times \frac{\Delta S_{2 \text{ perm}}}{d_a}$$

$\Delta S_{2 \text{ perm.}}$  see item 6.5.4  
for  $d_a$ , see section 1., item 1.1.1 or item 1.2.1

## 6.5.3 Radial misalignment

For the permissible radial misalignment  $\Delta K_{r_{perm}}$  (Fig. 6.5.3), - depending upon the operating speed -, refer to item 6.5.4.

## 6.5.4 Permissible shaft misalignment values for radial misalignment $\Delta K_{r_{perm}}$ and difference in gap dimension $\Delta S_{2perm}$

Values given in mm, rounded off

Type / Size		Coupling speed in 1/min								
H	HDS	250	500	750	1000	1500	2000	3000	4000	5000
80	88	0.4	0.3	0.25	0.2	0.2	0.15	0.15	0.1	0.1
95	103	0.5	0.35	0.25	0.25	0.2	0.2	0.15	0.1	0.1
110	118	0.5	0.35	0.3	0.25	0.2	0.2	0.15	0.1	0.1
125	135	0.5	0.4	0.3	0.25	0.25	0.2	0.15	0.15	0.1
140	152	0.6	0.4	0.35	0.3	0.25	0.2	0.2	0.15	
160	172	0.6	0.5	0.4	0.35	0.3	0.25	0.2	0.15	
180	194	0.6	0.5	0.4	0.35	0.3	0.25	0.2		
200	218	0.8	0.55	0.45	0.4	0.3	0.3	0.2		
225	245	0.8	0.55	0.5	0.4	0.35	0.3	0.25		
250	272	0.8	0.6	0.5	0.4	0.35	0.3			
280	305	1	0.7	0.6	0.5	0.4	0.35			
315	340	1	0.7	0.6	0.5	0.4	0.35			
350	380	1	0.8	0.6	0.6	0.5				
400	430	1.2	0.9	0.7	0.6	0.5				
440	472	1.3	1	0.7	0.7	0.6				

The numerical values of the table can be calculated as follows:

$$\Delta K_{r_{perm}} = \Delta S_{2perm} = \left( 0.1 + \frac{d_a}{1000} \right) \times \frac{40}{\sqrt{n}}$$

Coupling speed n in 1/min  
Coupling size designation  $d_a$  in mm  
(see section 1, item 1.1.1 or item 1.2.1)  
Radial misalignment  $K_{r_{perm}}$  in mm

**Caution!**

**Angular and radial misalignment may occur simultaneously.**

## 6.6 Tightening torques

N-EUPEX Coupling	N-EUPEX-DS Coupling	Tightening torque $T_A$ and spanner size $S_W$ for hexagon socket screws to DIN EN ISO 4762	
		$T_A$ Nm	$S_W$ mm
80	88	13	5
95	103	13	5
110	118	14	6
125	135	17.5	6
140	152	29	8
160	172	35	8
180	194	44	8
200	218	67.5	10
225	245	86	10
250	272	145	14
280	305	185	14
315	340	200	14
350	380	260	17
400	430	340	17
440	472	410	17

Table 6.6: Tightening torques for part 22 of Types H and HDS

**Note:** Tightening torques apply to screws with untreated surfaces which are not or only lightly oiled (coefficient of friction  $\mu = 0.14$ ). The use of lubricant paint or the like, which affects the coefficient of friction  $\mu$ , is not permitted.

**Note:** The tightening torques of the set screws are specified in item 6.1.3.

## 7. Start-up

### 7.1 Procedure before start-up

Before starting up check the flexible elements (12) for correct seating, i.e. the flexible elements (12) must sit flush with the end face of the hub, and the set screws for tightness, check and, if necessary, adjust the alignment and the gap dimension  $S_2$  and check all screw connections for the specified tightening torques (see section 6.).



**Then fit the coupling guard to prevent unintentional contact.**

## 8. Operation

### 8.1 General operating data

During operation of the coupling watch for:

- changes in running noise
- sudden shocks

#### **Caution!**

**If any irregularities are noticed during operation, switch the drive assembly off at once. Determine the cause of the fault, using the table in section 9.**

**This table contains a list of possible faults, their causes and suggested remedies.**

**If the cause cannot be identified or the unit repaired with the facilities available, you are advised to contact one of our customer-service offices for specialist assistance (see section 11.).**

## 9. Faults, causes and remedy

### 9.1 General

The following irregularities can serve as a guide for fault tracing.

Where the system is a complex one, all the other component units must be included when tracing faults.

The coupling must run with little noise and without vibration in all operating phases. Irregular behaviour must be treated as a fault requiring immediate remedy.

#### **Caution!**

**FLENDER will not be bound by the terms of the guarantee or otherwise be responsible in cases of improper use of the coupling, modifications carried out without FLENDER's agreement, or use of spare parts not supplied by FLENDER.**



**When remedying faults and malfunctions, the coupling must always be taken out of service.**

**Secure the drive unit to prevent it from being started up unintentionally. Attach a warning notice to the start switch.**

## 9.2 Possible faults

Malfunctions	Causes	Remedy
Sudden changes in the noise level and/or sudden vibrations	Change of alignment	<p>take the system out of service</p> <p>if necessary, rectify causes of alignment change (e.g. tighten loose foundation bolts)</p> <p>Check and, if necessary, adjust alignment (see section 6).</p> <p>Wear check, procedure as described in section 10</p>
	Flexible elements (12) worn	<p>take the system out of service</p> <p>Demount coupling and remove remains of flexible elements (12)</p> <p>Check and replace damaged coupling parts</p> <p>Flexible elements (12) must be changed in sets; use only identical N-EUPEX flexible elements (12)</p> <p>Assembly of coupling according to section 6. and section 7.</p>

Table 9.2: Possible faults

## 9.3 Incorrect use

Experience has shown that the following faults can result in incorrect use of the N-EUPEX coupling. In addition to observing the other instructions in this BA, care must therefore be taken to avoid these faults.



**Failure to observe these instructions may result in breakage of the coupling. Danger from flying fragments!**

### Caution!

**Incorrect use of the N-EUPEX coupling may result in damage to the coupling.**

### Caution!

**Coupling damage may result in stoppage of the drive and the entire system.**



## 9.3.1 Possible faults when selecting the coupling or coupling size

- Important information for describing the drive and the environment will not be communicated to others
- System torque too high
- System speed too high
- Application factor not correctly selected
- Chemically aggressive environment not taken into consideration
- The ambient temperature is not permissible. See also section 1.
- Finished bore with impermissible diameter (see section 1) and/or impermissible fit classification (see section 6.)
- The transmission capacity of the shaft-hub connection is not appropriate to the operating conditions

## 9.3.2 Possible faults when installing the coupling

- Components with transport or other damage are being fitted
- When mounting coupling parts in a heated condition, already mounted N-EUPEX flexible elements (12) are being excessively heated
- The shaft diameter is outside the specified tolerance range
- Coupling parts are being interchanged, i.e. their assignment to the specified shaft is incorrect
- Prescribed tightening torques are not being adhered to
- Alignment or shaft misalignment values do not match the operating instructions
- The coupled machines are not correctly fastened to the foundation, so a shifting of the machines e.g. through loosening of the foundation screw connection is causing excessive displacement of the coupling parts
- N-EUPEX flexible elements (12) are being omitted or incorrectly positioned
- Operating instructions are being changed without authorisation

## 9.3.3 Possible faults in maintenance

- Maintenance intervals are not being adhered to
- Original FLENDER N-EUPEX flexible elements (12) are not being used
- Old or damaged N-EUPEX flexible elements (12) are being used
- Different N-EUPEX flexible elements (12) are being used (see section 5.)
- Leakage in the vicinity of the coupling is not being identified and as a result chemically aggressive media are damaging the coupling

## 10. Maintenance and repair



**All work on the coupling must be carried out only when it is at a standstill. The drive unit must be secured against being switched on accidentally (e.g. by locking the key switch or removing the fuses from the power supply). A notice should be attached to the ON switch stating clearly that work is in progress.**

## 10.1 General

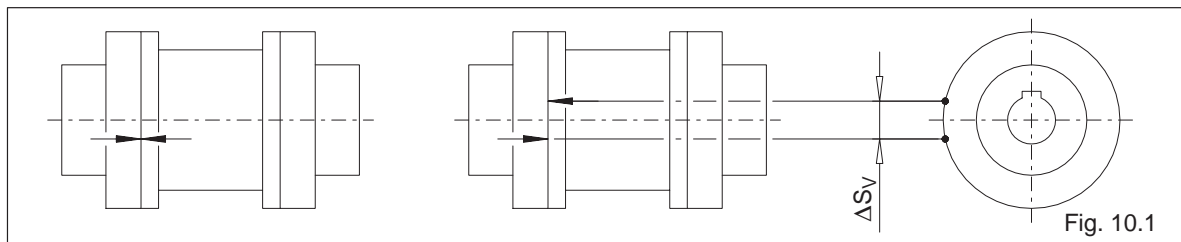
### Caution!

On Type H the torsional backlash between the two coupling parts must be checked after three months, then at least once a year. It is recommended that preventive maintenance, also on coupling types HDS, include the regular check of the torsional backlash.

If an increased coupling backlash does not impair the operation of the coupling, the flexible elements (12) can continue to be used up to a specified wear limit before being replaced. To assess wear, the permitted circumferential backlash, converted to the chord dimension  $\Delta S_V$  on the outer coupling diameter, is shown in table 10.1a. and table 10.1b. To obtain the dimension  $\Delta S_V$ , one coupling part is rotated without torque as far as the stop and a mark applied to a coupling part (see Fig. 10.1). If the coupling part is rotated in the opposite direction as far as the stop, the marks move apart. The distance between the marks is the chord dimension  $\Delta S_V$ . If the dimension  $\Delta S_V$  exceeds the value in table 10.1a or table 10.1b, the flexible elements (12) must be replaced.

### Caution!

The flexible elements (12) must be replaced in sets. Only identically marked flexible elements (12) must be used.



Size	80	95	110	125	140	160	180	200	225	250	280	315	350	400	440
Wear mark $\Delta S_V$ (mm)	5.0	6.0	7.0	8.0	8.0	8.0	8.0	8.5	9.0	10.0	11.5	10.5	11.5	13.0	14.0

Table 10.1 a: Wear mark of N-EUPEX coupling

Size	88	103	118	135	152	172	194	218	245	272
Wear mark $\Delta S_V$ (mm)	5.0	7.0	9.0	10.5	11.5	9.0	8.0	7.0	6.5	7.0

Table 10.1 b : Wear mark of the N-EUPEX-DS coupling

## 10.2 Replacement of wearing parts

Only **original N-EUPEX flexible elements** must be used for replacement to guarantee troublefree torque transmission and faultfree operation.

**Note:** The flexible elements (12) can be replaced without moving the coupled machines.

After disconnecting the parts 5/6 and parts 6/7 parts 5 and 7 are forced out of the centerings using a forcing-off threads in part 6. Part 7 is slit as far as possible into part 1. Part 6 can then be radially removed. Draw part 7 from part 1. The flexible elements (12) are now freely accessible.

For re-assembly, the instructions in section 6. "Assembly" and section 7. "Start-up" must be carefully observed.

## 11. Spare parts, customer-service addresses

By stocking the most important spare and wearing parts on site, you can ensure that the coupling is ready for use at any time.

When ordering spare parts, always state the following:

- Original order no.
- Part no. (see item 11.1)
- Specification / size (the size designation corresponds to the outside diameter  $d_a$  in mm)
- Quantity

We guarantee only the original spare parts supplied by us.

### Caution!

**Please note that spare parts and accessories not supplied by us have not been tested or approved by us. The installation or use of such products may therefore impair essential characteristics of the coupling under certain circumstances and so pose an active or passive hazard. FLENDER will assume no liability or guarantee for damage caused by spare parts and accessories not supplied by FLENDER.**

Please note that certain components often have special production and supply specifications and that we supply you with spare parts which comply fully with the current state of technical development as well as current legislation.

### 11.1 Spare parts list

Spare parts Type H, HDS	
Part no.	Description
1	Part 1
5	Part 5
6	Part 6
7	Part 7
12	Flexible elements
22	Cheese head screw

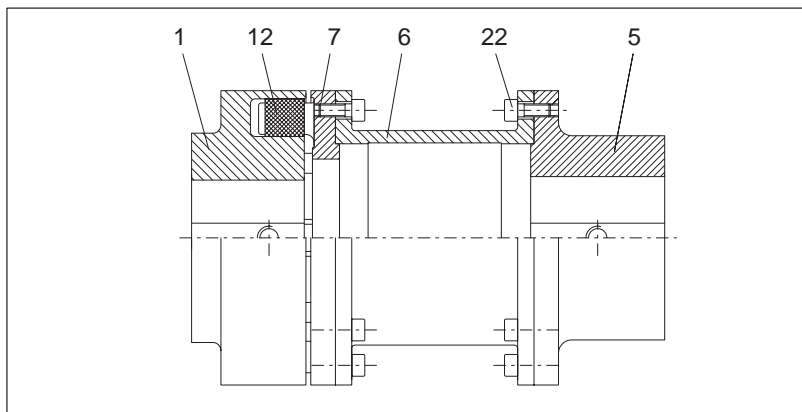


Table 11.1: Spare parts list, types H and HDS

## 11.2 Spare-part and customer service addresses

When ordering spare parts or requesting the services of our specialist engineers, please apply first to FLENDER AG.

### **FLENDER Germany**

#### **A. FRIEDR. FLENDER AG**

46393 Bocholt - Tel.: (0 28 71) 92-0 - Fax: (0 28 71) 92 25 96

E-mail: [contact@flender.com](mailto:contact@flender.com) • [www.flender.com](http://www.flender.com)

Shipping address: Alfred - Flender - Strasse 77 - 46395 Bocholt

#### **A. FRIEDR. FLENDER AG - Kupplungswerk Mussum**

Industriepark Bocholt - Schlavenhorst 100 - 46395 Bocholt - Tel.: (0 28 71) 92 28 68 - Fax: (0 28 71) 92 25 79

E-mail: [couplings@flender.com](mailto:couplings@flender.com) • [www.flender.com](http://www.flender.com)

#### **A. FRIEDR. FLENDER AG - Werk Friedrichsfeld**

Am Industriepark 2 - 46562 Voerde - Tel.: (0 28 71) 92-0 - Fax: (0 28 71) 92 25 96

E-mail: [contact@flender.com](mailto:contact@flender.com) • [www.flender.com](http://www.flender.com)

#### **Winergy AG**

Am Industriepark 2 - 46562 Voerde - Tel.: (0 28 71) 924 - Fax: (0 28 71) 92 24 87

E-mail: [info@winergy-ag.com](mailto:info@winergy-ag.com) • [www.winery-ag.com](http://www.winery-ag.com)

#### **A. FRIEDR. FLENDER AG - Getriebewerk Penig**

Thierbacher Strasse 24 - 09322 Penig - Tel.: (03 73 81) 60 - Fax: (03 73 81) 8 02 86

E-mail: [ute.tappert@flender.com](mailto:ute.tappert@flender.com) • [www.flender.com](http://www.flender.com)

#### **FLENDER - TÜBINGEN GMBH**

72007 Tübingen - Tel.: (0 70 71) 7 07-0 - Fax: (0 70 71) 70 74 00

E-mail: [sales-motox@flender-motox.com](mailto:sales-motox@flender-motox.com) • [www.flender.com](http://www.flender.com)

Shipping address: Bahnhofstrasse 40 - 72072 Tübingen

#### **LOHER GMBH**

94095 Ruhstorf - Tel.: (0 85 31) 3 90 - Fax: (0 85 31) 3 94 37

E-mail: [info@loher.de](mailto:info@loher.de) • [www.loher.de](http://www.loher.de)

Shipping address: Hans-Loher-Strasse 32 - 94099 Ruhstorf

#### **FLENDER SERVICE GMBH**

44607 Herne - Tel.: (0 23 23) 940-0 - Fax: (0 23 23) 940 333

E-mail: [infos@flender-service.com](mailto:infos@flender-service.com) • [www.flender-service.com](http://www.flender-service.com)

24h Service Hotline +49 (0) 17 22 81 01 00

Shipping address: Südstrasse 111 - 44625 Herne

#### **A. FRIEDR. FLENDER AG - FLENDER GUSS**

Obere Hauptstrasse 228-230 - 09228 Chemnitz / Wittgensdorf - Tel.: (0 37 22) 64-0 - Fax: (0 37 22) 64 21 89

E-mail: [flender.guss@flender-guss.com](mailto:flender.guss@flender-guss.com) • [www.flender-guss.de](http://www.flender-guss.de)

## Germany

**A. FRIEDR. FLENDER AG**

**46393 BOCHOLT - TEL.: (0 28 71) 92 - 0 - FAX: (0 28 71) 92 25 96**

**SHIPPING ADDRESS: ALFRED - FLENDER - STRASSE 77 - 46395 BOCHOLT**

---

**E-mail: [contact@flender.com](mailto:contact@flender.com) • [www.flender.com](http://www.flender.com)**

---

### **VERTRIEBSZENTRUM BOCHOLT**

46393 Bocholt  
Alfred-Flender-Strasse 77, 46395 Bocholt  
Tel.: (0 28 71) 92 - 0  
Fax: (0 28 71) 92 - 14 35  
E-mail: [vz.bocholt@flender.com](mailto:vz.bocholt@flender.com)

---

### **VERTRIEBSZENTRUM STUTTGART**

70472 Stuttgart  
Frielzheimer Strasse 3, 70499 Stuttgart  
Tel.: (07 11) 7 80 54 - 51  
Fax: (07 11) 7 80 54 - 50  
E-mail: [vz.stuttgart@flender.com](mailto:vz.stuttgart@flender.com)

---

### **VERTRIEBSZENTRUM MÜNCHEN**

85750 Karlsfeld  
Liebigstrasse 14, 85757 Karlsfeld  
Tel.: (0 81 31) 90 03 - 0  
Fax: (0 81 31) 90 03 - 33  
E-mail: [vz.muenchen@flender.com](mailto:vz.muenchen@flender.com)

---

### **VERTRIEBSZENTRUM BERLIN**

Schlossallee 8, 13156 Berlin  
Tel.: (0 30) 91 42 50 58  
Fax: (0 30) 47 48 79 30  
E-mail: [vz.berlin@flender.com](mailto:vz.berlin@flender.com)

---

### EUROPE

#### AUSTRIA

Flender Ges.m.b.H.  
Industriezentrum Nö-Süd  
Strasse 4, Objekt 14, Postfach 132  
2355 Wiener Neudorf  
Phone: +43 (0) 22 36 6 45 70  
Fax: +43 (0) 22 36 6 45 70 10  
E-mail: office@flender.at  
www.flender.at

#### BELGIUM & LUXEMBOURG

N.V. Flender Belge S.A.  
Cyriel Buyssestraat 130  
1800 Vilvoorde  
Phone: +32 (0) 2 - 2 53 10 30  
Fax: +32 (0) 2 - 2 53 09 66  
E-mail: sales@flender.be

#### BULGARIA

A. Friedr. Flender AG  
Branch Office  
c/o Auto - Profi GmbH  
Alabin Str., 1000 Sofia  
Phone: +359 (0) 2 - 9 80 66 06  
Fax: +359 (0) 2 - 9 80 33 01  
E-mail: sofia@auto-profi.com

#### CROATIA / SLOVENIA BOSNIA-HERZEGOVINA

A. Friedr. Flender AG  
Branch Office  
c/o HUM - Naklada d.o.o.  
Mandroviceva 3, 10000 Zagreb  
Phone: +385 (0) 1 - 2 30 60 25  
Fax: +385 (0) 1 - 2 30 60 24  
E-mail: flender@hi.hinet.hr

#### CZECH REPUBLIC

A. Friedr. Flender AG  
Branch Office  
Hotel DUO, Teplicka 17  
19000 Praha 9  
Phone: +420 (0) 2 - 83 88 23 00  
Fax: +420 (0) 2 - 83 88 22 05  
E-mail: flender\_pumpria@hotelduo.cz

#### DENMARK

Flender Scandinavia A/S  
Rugmarken 35 B, 3520 Farum  
Phone: +45 - 70 22 60 03  
Fax: +45 - 44 99 16 62  
E-mail: kontakt@flenderscandinavia.com  
www.flenderscandinavia.com

#### ESTHONIA / LATVIA / LITHUANIA

Flender Branch Office  
Addinol Mineralöl Marketing OÜ  
Suur-Sõjamäe 32  
11415 Tallinn / Esthonia  
Phone: +372 (0) 6 - 27 99 99  
Fax: +372 (0) 6 - 27 99 90  
E-mail: flender@addinol.ee  
www.addinol.ee

#### FINLAND

Flender Oy  
Ruosilantie 2 B, 00390 Helsinki  
Phone: +358 (0) 9 - 4 77 84 10  
Fax: +358 (0) 9 - 4 36 14 10  
E-mail: webmaster@flender.fi  
www.flender.fi

#### FRANCE

Flender s.a.r.l.  
3, rue Jean Monnet - B.P. 5  
78996 Elancourt Cedex  
Phone: +33 (0) 1 - 30 66 39 00  
Fax: +33 (0) 1 - 30 66 35 13  
E-mail: sales@flender.fr

#### SALES OFFICES:

Flender s.a.r.l.  
36, rue Jean Broquin  
69006 Lyon  
Phone: +33 (0) 4 - 72 83 95 20  
Fax: +33 (0) 4 - 72 83 95 39  
E-mail: sales@flender.fr

Flender - Graffenstaden SA  
1, rue du Vieux Moulin  
67400 Illkirch-Graffenstaden  
B.P. 84  
67402 Illkirch - Graffenstaden  
Phone: +33 (0) 3 - 88 67 60 00  
Fax: +33 (0) 3 - 88 67 06 17  
E-mail: flencomm@flender-graff.com

#### GREECE

Flender Hellas Ltd.  
2, Delfon str., 11146 Athens  
Phone: +30 210 - 2 91 72 80  
Fax: +30 210 - 2 91 71 02  
E-mail: flender@otenet.gr  
  
Mangrinox S.A.  
14, Grevenon str., 11855 Athens  
Phone: +30 210 - 3 42 32 01  
Fax: +30 210 - 3 45 99 28  
E-mail: mangrinox@otenet.gr

#### HUNGARY

A. Friedr. Flender AG  
Branch Office  
Bécsi Út 3-5, 1023 Budapest  
Phone: +36 (0) 1 - 3 45 07 90 / 91  
Fax: +36 (0) 1 - 3 45 07 92  
E-mail: jambor.laszlo@axelero.hu

#### ITALY

Flender Cigala S.p.A.  
Parco Tecnologico Manzoni  
Palazzina G  
Viale delle industrie, 17  
20040 Caponago (MI)  
Phone: +39 (0) 02 - 95 96 31  
Fax: +39 (0) 02 - 95 74 39 30  
E-mail: info@flendercigala.it

#### THE NETHERLANDS

Flender Nederland B.V.  
Industrieterrein Lansinghage  
Platinastraat 133  
2718 ST Zoetermeer  
Postbus 725  
2700 AS Zoetermeer  
Phone: +31 (0) 79 - 3 61 54 70  
Fax: +31 (0) 79 - 3 61 54 69  
E-mail: sales@flender.nl  
www.flender.nl  
  
SALES OFFICES:  
Flender Nederland B.V.  
Lage Brink 5-7  
7317 BD Apeldoorn  
Postbus 1073  
7301 BH Apeldoorn  
Phone: +31 (0) 55 - 5 27 50 00  
Fax: +31 (0) 55 - 5 21 80 11  
E-mail: tom.alberts@flender-group.com

Bruinhof B.V.  
Boterdiep 37  
3077 AW Rotterdam  
Postbus 9607  
3007 AP Rotterdam  
Phone: +31 (0) 10 - 4 97 08 08  
Fax: +31 (0) 10 - 4 82 43 50  
E-mail: info@bruinhof.nl  
www.bruinhof.nl

#### NORWAY

Elektroprosess AS  
Frysjaeveien 40, 0884 Oslo  
Postboks 165, Kjelsås  
0411 Oslo  
Phone: +47 (0) 2 - 2 02 10 30  
Fax: +47 (0) 2 - 2 02 10 50 / 51  
E-mail: post@elektroprosess.no

#### POLAND

A. Friedr. Flender AG  
Branch Office  
Przedstawicielstwo w Polsce  
ul. Wyzwolenia 27  
43 - 190 Mikolów  
Phone: +48 (0) 32 - 2 26 45 61  
Fax: +48 (0) 32 - 2 26 45 62  
E-mail: flender@pro.onet.pl  
www.flender.pl

#### PORTUGAL

Rodamientos FEYC, S.A.  
R. Jaime Lopes Dias, 1668 CV  
1750 - 124 Lissabon  
Phone: +351 (0) 21 - 7 54 24 10  
Fax: +351 (0) 21 - 7 54 24 19  
E-mail: info@rportugal.com

#### ROMANIA

A. Friedr. Flender AG  
Branch Office  
98 - 106, Soseaua Mihai Bravu  
Sector 2, Bloc D 16, Sc 1, Apartament 4  
021331 Bucuresti - 2  
Phone: +40 (0) 21 - 4 91 10 08  
Fax: +40 (0) 21 - 4 91 10 08  
E-mail: flender@fx.ro

#### RUSSIA

F & F GmbH  
Tjuschina 4-6  
191119 St. Petersburg  
Phone: +7 (0) 8 12 - 3 20 90 34  
Fax: +7 (0) 8 12 - 3 40 27 60  
E-mail: flendergus@mail.spbnit.ru

#### SLOVAKIA

A. Friedr. Flender AG  
Branch Office  
Vajanského 49  
P.O. Box 286, 08001 Presov  
Phone: +421 (0) 51 - 7 70 32 67  
Fax: +421 (0) 51 - 7 70 32 67  
E-mail: micenko.flender@nextra.sk

#### SPAIN

Flender Ibérica S.A.  
Poligono Industrial San Marcos  
Calle Morse, 31 (Parcela D-15)  
28906 Getafe - Madrid  
Phone: +34 (0) 91 - 6 83 61 86  
Fax: +34 (0) 91 - 6 83 46 50  
E-mail: f-iberica@flender.es  
www.flender.es

#### SWEDEN

Flender Scandinavia  
Åsensvägen 2  
44339 Lerum  
Phone: +46 (0) 302 - 1 25 90  
Fax: +46 (0) 302 - 1 25 56  
E-mail: kontakt@flenderscandinavia.com  
www.flenderscandinavia.com

#### SWITZERLAND

Flender AG  
Zeughausstr. 48  
5600 Lenzburg  
Phone: +41 (0) 62 8 85 76 00  
Fax: +41 (0) 62 8 85 76 76  
E-mail: info@flender.ch  
www.flender.ch

#### TURKEY

Flender Güc Aktarma Sistemleri  
Sanayi ve Ticaret Ltd. Sti.  
IMES Sanayi, Sitesi  
E Blok 502, Sokak No. 22  
81260 Dudullu - Istanbul  
Phone: +90 (0) 2 16 - 4 66 51 41  
Fax: +90 (0) 2 16 3 64 59 13  
E-mail: cuzkan@flendertr.com  
www.flendertr.com

#### UKRAINE

A. Friedr. Flender AG  
Branch Office, c/o DIV - Deutsche Industrie-  
vertretung, Prospect Pobedy 44  
252057 Kiev  
Phone: +380 (0) 44 - 4 46 80 49  
Fax: +380 (0) 44 - 2 30 29 30  
E-mail: flender@div.kiev.ua

#### UNITED KINGDOM & EIRE

Flender Power Transmission Ltd.  
Thornbury Works, Leeds Road  
Bradford  
West Yorkshire BD3 7EB  
Phone: +44 (0) 12 74 65 77 00  
Fax: +44 (0) 12 74 66 98 36  
E-mail: flenders@flender-power.co.uk  
www.flender-power.co.uk

## SERBIA-MONTENEGRO ALBANIA / MACEDONIA

A. Friedr. Flender AG  
Branch Office  
c/o G.P.Inzenjering d.o.o.  
III Bulevar 54 / 19  
11070 Novi Beograd  
Phone: +381 (0) 11 - 60 44 73  
Fax: +381 (0) 11 - 3 11 67 91  
E-mail: flender@eunet.yu

## AFRICA

### NORTH AFRICAN COUNTRIES

Please refer to Flender s.a.r.l.  
3, rue Jean Monnet - B.P. 5  
78996 Elancourt Cedex  
Phone: +33 (0) 1 - 30 66 39 00  
Fax: +33 (0) 1 - 30 66 35 13  
E-mail: sales@flender.fr

### EGYPT

Sons of Farid Hassanen  
81 Matbaa Ahlia Street  
Boulac 11221, Cairo  
Phone: +20 (0) 2 - 5 75 15 44  
Fax: +20 (0) 2 - 5 75 17 02  
E-mail: hussein@sonfarid.com

### SOUTH AFRICA

Flender Power Transmission (Pty.) Ltd.  
Cnr. Furnace St & Quality Rd.  
P.O. Box 131, Isando 1600  
Johannesburg  
Phone: +27 (0) 11 - 5 71 20 00  
Fax: +27 (0) 11 - 3 92 24 34  
E-mail: sales@flender.co.za  
www.flender.co.za

SALES OFFICES:  
Flender Power Transmission (Pty.) Ltd.  
Unit 3 Marconi Park  
9 Marconi Crescent, Montague Gardens  
P.O. Box 37291  
Chempet 7442, Cape Town  
Phone: +27 (0) 21 - 5 51 50 03  
Fax: +27 (0) 21 - 5 52 38 24  
E-mail: sales@flender.co.za

Flender Power Transmission (Pty.) Ltd.  
Unit 3 Goshawk Park  
Falcon Industrial Estate  
P.O. Box 1608  
New Germany 3620, Durban  
Phone: +27 (0) 31 - 7 05 38 92  
Fax: +27 (0) 31 - 7 05 38 72  
E-mail: sales@flender.co.za

Flender Power Transmission (Pty.) Ltd.  
9 Industrial Crescent, Ext. 25  
P.O. Box 17609, Witbank 1035  
Phone: +27 (0) 13 - 6 92 34 38  
Fax: +27 (0) 13 - 6 92 34 52  
E-mail: sales@flender.co.za

Flender Power Transmission (Pty.) Ltd.  
Unit 14 King Fisher Park, Alton  
Cnr. Ceramic Curve & Alumina Allee  
P.O. Box 101995  
Meerensee 3901, Richards Bay  
Phone: +27 (0) 35 - 7 51 15 63  
Fax: +27 (0) 35 - 7 51 15 64  
E-mail: sales@flender.co.za

## AMERICA

### ARGENTINA

Chilicote S.A.  
Avda. Julio A. Roca 546  
C 1067 ABN Buenos Aires  
Phone: +54 (0) 11 - 43 31 66 10  
Fax: +54 (0) 11 - 43 31 42 78  
E-mail: chilicote@chilicote.com.ar

### BRASIL

Flender Brasil Ltda.  
Rua Quatorze, 60 - Cidade Industrial  
32211 - 970, Contagem - MG  
Phone: +55 (0) 31 - 33 69 21 00  
Fax: +55 (0) 31 - 33 69 21 66  
E-mail: vendas@flenderbrasil.com

### SALES OFFICES:

Flender Brasil Ltda.  
Rua James Watt, 142  
conj. 142 - Brooklin Novo  
04576 - 050, São Paulo - SP  
Phone: +55 (0) 11 - 55 05 99 33  
Fax: +55 (0) 11 - 55 05 30 10  
E-mail: flesao@uol.com.br

Flender Brasil Ltda.  
Rua Campos Salles, 1095  
sala 04 - Centro 14015 - 110,  
Ribeirão Preto - SP  
Phone: +55 (0) 16 - 6 35 15 90  
Fax: +55 (0) 16 - 6 35 11 05  
E-mail: flender.ribpreto@uol.com.br

### CANADA

Flender Power Transmission Inc.  
215 Shields Court, Units 4 - 6  
Markham, Ontario L3R 8V2  
Phone: +1 (0) 9 05 - 3 05 10 21  
Fax: +1 (0) 9 05 - 3 05 10 23  
E-mail: flender@ca.inter.net  
www.flenderpti.com

### SALES OFFICE:

Flender Power Transmission Inc.  
34992 Bemina Court  
Abbotsford - Vancouver  
B.C. V3G 1C2  
Phone: +1 (0) 6 04 - 8 59 66 75  
Fax: +1 (0) 6 04 - 8 59 68 78  
E-mail: tvickers@rapidnet.net

### CHILE / ARGENTINA / BOLIVIA ECUADOR / PARAGUAY / URUGUAY

Flender Cono Sur Limitada  
Avda. Galvarino Gallardo 1534  
Providencia, Santiago  
Phone: +56 (0) 2 - 2 35 32 49  
Fax: +56 (0) 2 - 2 64 20 25  
E-mail: flender@flender.cl  
www.flender.cl

### COLOMBIA

A.G.P. Representaciones Ltda.  
Flender Liaison Office Colombia  
Av Boyaca No 23A  
50 Bodega UA 7-1, Bogotá  
Phone: +57 (0) 1 - 5 70 63 53  
Fax: +57 (0) 1 - 5 70 73 35  
E-mail: aguerrero@agp.com.co  
www.agp.com.co

### MEXICO

Flender de Mexico S.A. de C.V.  
17, Pte. 713 Centro  
72000 Puebla  
Phone: +52 (0) 2 22 - 2 37 19 00  
Fax: +52 (0) 2 22 - 2 37 11 33  
E-mail: szugasti@flendermexico.com  
www.flendermexico.com

### SALES OFFICES:

Flender de Mexico S.A. de C.V.  
Lago Nargis No. 38  
Col. Granada,  
11520 Mexico, D.F.  
Phone: +52 (0) 55 - 52 54 30 37  
Fax: +52 (0) 55 - 55 31 69 39  
E-mail: info@flendermexico.com

Flender de Mexico S.A. de C.V.  
Ave. San Pedro No. 231-5  
Col. Miravalle  
64660 Monterrey, N.L.  
Phone: +52 (0) 81 - 83 63 82 82  
Fax: +52 (0) 81 - 83 63 82 83  
E-mail: info@flendermexico.com

### PERU

Potencia Industrial E.I.R.L.  
Calle Victor González Olaechea N° 110  
Urb. La Aurora - Miraflores,  
P.O.Box: Av. 2 de Mayo N° 679  
Of.108-Miraflores  
Casilla N° 392, Lima 18  
Phone: +51 (0) 1 - 2 42 84 68  
Fax: +51 (0) 1 - 2 42 08 62  
E-mail: cesarzam@chavin.rcp.net.pe

### USA

Flender Corporation  
950 Tollgate Road  
P.O. Box 1449, Elgin, IL. 60123  
Phone: +1 (0) 8 47 - 9 31 19 90  
Fax: +1 (0) 8 47 - 9 31 07 11  
E-mail: flender@flenderusa.com  
www.flenderusa.com

Flender Corporation  
Service Centers West  
4234 Foster Ave.  
Bakersfield, CA. 93308  
Phone: +1 (0) 6 61 - 3 25 44 78  
Fax: +1 (0) 6 61 - 3 25 44 70  
E-mail: flender1@lightspeed.net

### VENEZUELA

F. H. Transmisiones S.A.  
Urbanización Buena Vista  
Calle Johan Schafer o Segunda Calle  
Municipio Sucre, Petare  
Caracas  
Phone: +58 (0) 2 - 21 52 61  
Fax: +58 (0) 2 - 21 18 38  
E-mail: fhtransm@telcel.net.ve  
www.fhtransmisiones.com

## ASIA

### BANGLADESH / SRI LANKA

Please refer to Flender Limited  
No. 2 St. George's Gate Road  
5th Floor, Hastings  
Kolkata - 700 022  
Phone: +91 (0) 33 - 2 23 05 45  
Fax: +91 (0) 33 - 2 23 18 57  
E-mail: flender@flenderindia.com

### PEOPLE'S REPUBLIC OF CHINA

Flender Power Transmission  
(Tianjin) Co. Ltd.  
ShuangHu Rd.- Shuangchen Rd. West  
Beichen Economic Development  
Area (BEDA)  
Tianjin 300400  
Phone: +86 (0) 22 - 26 97 20 63  
Fax: +86 (0) 22 - 26 97 20 61  
E-mail: flender@flendertj.com  
www.flendertj.com  
Flender Power Transmission  
(Tianjin) Co. Ltd.  
Beijing Office  
C-415, Lufthansa Center  
50 Liangmaqiao Road, Chaoyang District  
Beijing 100016  
Phone: +86 (0) 10 - 64 62 21 51  
Fax: +86 (0) 10 - 64 62 21 43  
E-mail: beijing@flenderprc.com.cn  
Flender Power Transmission  
(Tianjin) Co. Ltd.  
Shanghai Office  
1101-1102 Harbour Ring Plaza  
18 Xizang Zhong Rd.  
Shanghai 200 001  
Phone: +86 (0) 21 - 53 85 31 48  
Fax: +86 (0) 21 - 53 85 31 46  
E-mail: shanghai@flenderprc.com.cn

Flender Power Transmission  
(Tianjin) Co. Ltd.  
Wuhan Office  
Rm. 1503, Jianyin Building,  
709 Jianshedao  
Wuhan 430 015  
Phone: +86 (0) 27 - 85 48 67 15  
Fax: +86 (0) 27 - 85 48 68 36  
E-mail: wuhan@flenderprc.com.cn

Flender Power Transmission  
(Tianjin) Co. Ltd.  
Guangzhou Office  
Rm. 2802, Guangzhou International  
Electronics Tower  
403 Huanshi Rd. East  
Guangzhou 510 095  
Phone: +86 (0) 20 - 87 32 60 42  
Fax: +86 (0) 20 - 87 32 60 45  
E-mail: guangzhou@flenderprc.com.cn

Flender Power Transmission  
(Tianjin) Co. Ltd.  
Chengdu Office  
G-6 / F Guoxin Mansion,  
77 Xiyu Street  
Chengdu 610 015  
Phone: +86 (0) 28 - 86 19 83 72  
Fax: +86 (0) 28 - 86 19 88 10  
E-mail: chengdu@flenderprc.com.cn



# FLENDER

Flender Power Transmission  
(Tianjin) Co. Ltd.  
Shenyang Office  
Rm. 2-163, Tower I, City Plaza Shenyang  
206 Nanjing Street (N), Heping District  
Shenyang 110 001  
Phone: +86 (0) 24 - 23 34 20 48  
Fax: +86 (0) 24 - 23 34 20 46  
E-mail: shenyang@flenderprc.com.cn

Flender Power Transmission  
(Tianjin) Co. Ltd.  
Xi'an Office  
Rm. 302, Shaanzi Zhong Da  
International Mansion  
30 Southern Rd.  
Xi'an 710 002  
Phone: +86 (0) 29 - 7 20 32 68  
Fax: +86 (0) 29 - 7 20 32 04  
E-mail: xian@flenderprc.com.cn

## INDIA

Flender Limited  
Head Office:  
No. 2 St. George's Gate Road  
5th Floor, Hastings  
Kolkata - 700 022  
Phone: +91 (0) 33 - 22 23 05 45  
Fax: +91 (0) 33 - 22 23 08 30  
E-mail: flender@flenderindia.com

Flender Limited  
Industrial Growth Centre  
Rakhajungle, Nimpura  
Kharagpur - 721 302  
Phone: +91 (0) 3222 - 23 33 07  
Fax: +91 (0) 3222 - 23 33 64  
E-mail: works@flenderindia.com

**SALES OFFICES:**  
Flender Limited  
Eastern Regional Sales Office  
No. 2 St. George's Gate Road  
5th Floor, Hastings  
Kolkata - 700 022  
Phone: +91 (0) 33 - 22 23 05 45  
Fax: +91 (0) 33 - 22 23 08 30  
E-mail: ero@flenderindia.com

Flender Limited  
Western Regional Sales Office  
Plot No. 23, Sector 19 - C  
Vashi, Navi Mumbai - 400 705  
Phone: +91 (0) 22 - 27 65 72 27  
Fax: +91 (0) 22 - 27 65 72 28  
E-mail: wro@flenderindia.com

Flender Limited  
Southern Regional Sales Office  
41 Nelson Manickam Road  
Aminjikarai,  
Chennai - 600 029  
Phone: +91 (0) 44 - 23 74 39 21  
Fax: +91 (0) 44 - 23 74 39 19  
E-mail: sro@flenderindia.com

Flender Limited  
Northern Regional Sales Office  
209-A, Masjid Moth, 2nd Floor  
(Behind South Extension II)  
New Delhi - 110 049  
Phone: +91 (0) 11 - 26 25 02 21  
Fax: +91 (0) 11 - 26 25 63 72  
E-mail: nro@flenderindia.com

## INDONESIA

Flender Singapore Pte. Ltd.  
Representative Office  
Perkantoran Puri Niaga II  
Jalan Puri Kencana Blok J1  
No. 2i, Kembangan  
Jakarta Barat 11610  
Phone: +62 (0) 21 - 5 82 86 24  
Fax: +62 (0) 21 - 5 82 86 23  
E-mail: bobwall@cbn.net.id

## IRAN

Cimaghand Co. Ltd.  
P.O. Box 15745-493  
No. 13, 16th East Street  
Beyhaghi Ave., Argentina Sq.  
Tehran 15156  
Phone: +98 (0) 21 - 8 73 02 14  
Fax: +98 (0) 21 - 8 73 39 70  
E-mail: info@cimaghand.com

## ISRAEL

Greenshpon Engineering Works Ltd.  
Haamelim Street 20  
P.O. Box 10108, 26110 Haifa  
Phone: +972 (0) 4 - 8 72 11 87  
Fax: +972 (0) 4 - 8 72 62 31  
E-mail: sales@greenshpon.com  
www.greenshpon.com

## JAPAN

Flender Japan Co., Ltd.  
WBG Marive East 21F  
Nakasa 2 - 6  
Mihama-ku, Chiba-shi  
Chiba 261-7121  
Phone: +81 (0) 43 - 2 13 39 30  
Fax: +81 (0) 43 - 2 13 39 55  
E-mail: contact@flender-japan.com

## KOREA

Flender Ltd.  
7th Fl. Dorim Bldg.  
1823 Bangbae-Dong, Seocho-Ku,  
Seoul 137-060  
Phone: +82 (0) 2 - 34 78 63 37  
Fax: +82 (0) 2 - 34 78 63 45  
E-mail: flender@unitel.co.kr

## KUWAIT

South Gulf Company  
Al-Reqai, Plot 1, Block 96  
P.O. Box 26229, Safat 13123  
Phone: +965 (0) - 4 88 39 15  
Fax: +965 (0) - 4 88 39 14  
E-mail: adelameen@hotmail.com

## LEBANON

Gabriel Acar & Fils s.a.r.l.  
Dahr-el-Jamal  
Zone Industrielle, Sin-el-Fil  
B.P. 80484, Beyrouth  
Phone: +961 (0) 1 - 49 82 72  
Fax: +961 (0) 1 - 49 49 71  
E-mail: gacar@beirut.com

## MALAYSIA

Flender Singapore Pte. Ltd.  
Representative Office  
37 A - 2, Jalan PJU 1/39  
Dataran Prima  
47301 Petaling Jaya  
Selangor Darul Ehsan  
Phone: +60 (0) 3 - 78 80 42 63  
Fax: +60 (0) 3 - 78 80 42 73  
E-mail: flender@tm.net.my

## PAKISTAN

Please refer to  
A. Friedr. Flender AG  
46393 Bocholt  
Phone: +49 (0) 28 71 - 92 22 59  
Fax: +49 (0) 28 71 - 92 15 16  
E-mail: ludger.wittag@flender.com

## PHILIPPINES

Flender Singapore Pte. Ltd.  
Representative Office  
28/F, Unit 2814  
The Enterprice Centre  
6766 Ayala Avenue corner  
Paeso de Roxas, Makati City  
Phone: +63 (0) 2 - 8 49 39 93  
Fax: +63 (0) 2 - 8 49 39 17  
E-mail: roman@flender.com.ph

## BAHRAIN / IRAQ / JORDAN / LYBIA OMAN / QATAR / U.A.E. / YEMEN

Please refer to A. Friedr. Flender AG  
Middle East Sales Office  
IMES Sanayi Sitesi  
E Blok 502, Sokak No. 22  
81260 Dudullu - Istanbul  
Phone: +90 (0) 2 16 - 4 99 66 23  
Fax: +90 (0) 2 16 - 3 64 59 13  
E-mail: meso@flendertr.com

## SAUDI ARABIA

South Gulf Co.  
Al-Khobar, Dahrhan Str.  
Middle East Trade Center  
3rd floor, Flat # 23  
P.O. Box 20434 31952 Al-Khobar  
Phone: +966 (0) 3 - 8 87 53 32  
Fax: +966 (0) 3 - 8 87 53 31  
E-mail: adelameen@hotmail.com

## SINGAPORE

Flender Singapore Pte. Ltd.  
13 A, Tech Park Crescent  
Singapore 637843  
Phone: +65 (0) - 68 97 94 66  
Fax: +65 (0) - 68 97 94 11  
E-mail: flender@singnet.com.sg  
www.flender.com.sg

## SYRIA

Misrabi Co & Trading  
Mezzeh Autostrade Transportation  
Building 4/A, 5th Floor  
P.O. Box 12450, Damascus  
Phone: +963 (0) 11 - 6 11 67 94  
Fax: +963 (0) 11 - 6 11 09 08  
E-mail: ismael.misrabi@gmx.net

## TAIWAN

A. Friedr. Flender AG  
Taiwan Branch Company  
1F, No. 5, Lane 240  
Nan Yang Street, Hsichih  
Taipei Hsien 221  
Phone: +886 (0) 2 - 26 93 24 41  
Fax: +886 (0) 2 - 26 94 36 11  
E-mail: flender\_tw@flender.com.tw

## THAILAND

Flender Singapore Pte. Ltd.  
Representative Office  
23/F M Thai Tower, All Seasons Place  
87 Wireless Road, Phatumwan  
Bangkok 10330  
Phone: +66 (0) 2 - 6 27 91 09  
Fax: +66 (0) 2 - 6 27 90 01  
E-mail: christian.beckers@flender.th.com

## VIETNAM

Flender Singapore Pte. Ltd.  
Representative Office  
Suite 6/6A, 16F Saigon Tower  
29 Le Duan Street, District 1  
Ho Chi Minh City, Vietnam  
Phone: +84 (0) 8 - 8 23 62 97  
Fax: +84 (0) 8 - 8 23 62 88  
E-mail: flender@hcm.vnn.vn

## AUSTRALIA

Flender (Australia) Pty. Ltd.  
9 Nello Place, P.O. Box 6047  
Wetherill Park  
N.S.W. 2164, Sydney  
Phone: +61 (0) 2 - 97 56 23 22  
Fax: +61 (0) 2 - 97 56 48 92, 97 56 14 92  
E-mail: sales@flender.com.au  
www.flender.com.au

**SALES OFFICES:**  
Flender (Australia) Pty. Ltd.  
Suite 3, 261 Centre Rd.  
Bentleigh, VIC 3204 Melbourne  
Phone: +61 (0) 3 - 95 57 08 11  
Fax: +61 (0) 3 - 95 57 08 22  
E-mail: sales@flender.com.au

Flender (Australia) Pty. Ltd.  
Suite 5, 1407 Logan Rd.  
Mt. Gravatt  
QLD 4122, Brisbane  
Phone: +61 (0) 7 - 34 22 23 89  
Fax: +61 (0) 7 - 34 22 24 03  
E-mail: sales@flender.com.au

Flender (Australia) Pty. Ltd.  
Suite 2 403 Great Eastern Highway  
W.A. 6104, Redcliffe - Perth  
Phone: +61 (0) 8 - 94 77 41 66  
Fax: +61 (0) 8 - 94 77 65 11  
E-mail: sales@flender.com.au

## NEW ZEALAND

Please refer to Flender (Australia) Pty. Ltd.  
9 Nello Place, P.O. Box 6047  
Wetherill Park  
N.S.W. 2164, Sydney  
Phone: +61 (0) 2 - 97 56 23 22  
Fax: +61 (0) 2 - 97 56 48 92  
E-mail: sales@flender.com.au



## 12. Declaration by the manufacturer

### Declaration by the manufacturer

in accordance with EC Engineering Guideline 98/37/EC, Appendix II B

We hereby declare that the

### Flexible **N-EUPEX** and **N-EUPEX-DS** couplings Types **H** and **HDS**

described in these Operating Instructions are intended for incorporation in a machine, and that it is prohibited to put them into service before verifying that the machine into which they are incorporated complies with the EC Guidelines (original edition 98/37/EC including any subsequent amendments thereto).

This Manufacturer's Declaration takes into account all the unified standards (inasmuch as they apply to our products) published by the European Commission in the Official Journal of the European Community.



Bocholt, 2003-07-10

\_\_\_\_\_  
Signature (person responsible for products)